

LISTING OF THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-10. (Canceled).

11. (Previously Presented) A method for producing a micromechanical oscillating mirror device, comprising:

providing one of an SOI and an EOI structure having a silicon substrate layer, an oxide layer provided on the silicon substrate layer, and an Si functional layer provided on the oxide layer, wherein an upper region of the silicon substrate layer is provided as a sacrificial layer;

forming at least a first trench that extends through the functional layer to the oxide layer, by a first anisotropic plasma etching step that exposes a laterally-formed island region in the functional layer;

providing a passivating layer that covers at least the sidewalls of the trench;

extending a bottom of the first trench to the silicon substrate layer by a physically directed etching;

deep etching the first trench using a second anisotropic plasma etching step starting from the bottom of the trench and extending the trench to a predetermined depth of the silicon substrate layer, wherein the second anisotropic plasma etching step specifies the depth of the sacrificial layer; and

performing an isotropic sacrificial layer etching step starting from the first trench to remove a region of the sacrificial layer below the island region by lateral etching undercutting of the silicon substrate layer, whereby the island region is exposed and made vertically movable.

12. (Previously Presented) The method as recited in Claim 11, wherein the isotropic sacrificial layer etching step takes place selectively with respect to the passivating layer and the oxide layer.

13. (Previously Presented) The method as recited in Claim 12, wherein the exposed island region is connected to a region of the functional layer that surrounds the island region by at least one connecting crosspiece, whereby the exposed island region is able to perform torsional motions about the at least one connecting crosspiece, the torsional motions having an amplitude such that a part of the island region projects into a region of the silicon substrate layer that has been etched.

14. (Previously Presented) The method as recited in Claim 13, wherein the at least one connecting crosspiece includes a narrow region of the functional layer that has been left intact.

15. (Previously Presented) The method as recited in Claim 11, further comprising:

forming at least a second trench within the island region and etching the second trench to the sacrificial layer depth;

wherein the isotropic sacrificial layer etching step is performed simultaneously from both the first and second trenches.

16. (Previously Presented) The method as recited in Claim 15, further comprising:

forming at least one additional layer on top of the functional layer, wherein the at least one additional layer improves the reflectivity of the mirror surface, the at least one additional layer covering the second trench within the island region but exposing the first trench that separates the island region from the surrounding functional layer.

17. (Previously Presented) The method as recited in Claim 16, wherein the first trench is wider than the second trench.

18. (Previously Presented) The method as recited in Claim 11, wherein the sacrificial layer etching step includes chemical dry etching using one of XeF₂, ClF₃, NF₃ and BrF₃ gas.

19. (Previously Presented) The method as recited in Claim 15, wherein the sacrificial layer etching step includes chemical dry etching using one of XeF₂, ClF₃, NF₃ and BrF₃ gas.

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20. (Previously Presented) The method as recited in Claim 16, wherein the sacrificial layer etching step includes chemical dry etching using one of XeF_2 , ClF_3 , NF_3 and BrF_3 gas.

21. (Previously Presented) The method as recited in Claim 11, wherein the passivating layer is formed by one of CVD deposition and thermal oxidation.

22. (Previously Presented) The method as recited in Claim 15, wherein the passivating layer is formed by one of CVD deposition and thermal oxidation.

23. (Previously Presented) The method as recited in Claim 16, wherein the passivating layer is formed by one of CVD deposition and thermal oxidation.

24. (Previously Presented) The method as recited in Claim 11, further comprising:
removing, by a chemical dry etching using $\text{HF}/\text{H}_2\text{O}$ gas, at least one of the passivating layer and the oxide layer after the sacrificial layer etching step.

25. (Previously Presented) The method as recited in Claim 15, further comprising:
removing, by a chemical dry etching using $\text{HF}/\text{H}_2\text{O}$ gas, at least one of the passivating layer and the oxide layer after the sacrificial layer etching step.

26. (Previously Presented) The method as recited in Claim 16, further comprising:
removing, by a chemical dry etching using $\text{HF}/\text{H}_2\text{O}$ gas, at least one of the passivating layer and the oxide layer after the sacrificial layer etching step.